

## Multifunction Warning Device

[0001] The present invention is a continuation-in-part application of the co-pending U.S. serial No. 10/633,420 application filed on August 4, 2003.

### 5 TECHNICAL FIELD

[0002] This invention relates generally to a warning device, in particular, a multifunction warning device having features of being a flashlight, a warning sign and an illuminating traffic baton.

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### BACKGROUND OF THE INVENTION

[0003] A conventional warning device is a triangle frame on which a reflective material is adhered such that when a car accident happened or a car is out of order, the driver puts the warning device on a position behind of the car at a certain distance for warning the following cars not to drive in this same line to prevent a possible accident. However, the conventional warning device has only one feature and the reflection function may be reduced in a fog area or a dark area and possibly be omitted because of its small occupation.

20 [0004] A conventional multi-purposes warning device includes a battery container, a tube threadedly engaged to an end of the battery container and a flash bulb disposed in the tube, a bracket pivotally engaged to the tube and a flashlight head pivotally engaged to the bracket, a socket slidably mounted to the battery container and the tube, and three legs, wherein each of the three legs has an end pivotally connected to the  
25 socket and a stick pivotally connected between the inner side of each of the legs and

an outer periphery of the battery container, such that the three legs can be arranged to be a triangle warning sign and the flash bulb provides a flash light. However, the conventional multi-purposes warning device cannot be used as a traffic baton. In addition, the warning effect is not good enough because the legs as a warning sign cannot illuminate by themselves.

[0005] None of the conventional warning device has a battery that can be recharged through different ways. Therefore a multifunction warning device that can be used as a flashlight, a traffic warning sign and illuminating traffic baton and at the same time its battery can be recharged manually as well as through automobile charging system is needed.

## SUMMARY OF INVENTION

[0006] It is therefore an objective of the present invention to provide a multifunction warning device that can be used as a flashlight, a traffic warning sign and illuminating traffic baton.

[0007] Another object of the invention is to provide a multifunction warning device with a battery that can be recharged manually or through automobile charging system.

[0008] The present invention, briefly summarized, in one embodiment discloses a multifunction warning device, which mainly contains a base, plural legs, and a rechargeable device. The base has a top portion and a bottom portion having a first electric socket therein. Each of the plural legs is pivotally secured to the base. Each of the plural legs has plural illuminating elements thereon. The plural illuminating elements are electrically connected to the first electric socket. The rechargeable device contains a shell, plural rechargeable batteries, a charging circuit, and a

discharging circuit. The shell has a charging connector detachably plugged into the first electric socket. The charging connector has a first electric contact, a second electric contact and a third electric contact. The plural rechargeable batteries are installed within the shell. The charging circuit is installed within the shell. The

5 charging circuit is electrically connected to the plural rechargeable batteries and a first electrical point (not shown) between the first electric contact and the second electric contact for recharging the plural rechargeable batteries through the first electric contact and the second electric contact when the charging connector is plugged into an automobile charging socket. The discharging circuit is installed within the shell, the

10 discharging circuit is electrically connected to the plural rechargeable batteries and a second electrical point (not shown) between the first electric contact and the third electric contact for providing electric power from the plural rechargeable batteries to the plural illuminating elements through the first electric contact, the third electric contact and the first electric socket when the charging connector is plugged into the

15 first electric socket. The plural legs are stretchable to be a support and retractable to be assembled as a baton.

#### BRIEF DESCRIPTION OF DRAWINGS

20 [0009] The invention will be more clearly understood after refer to the following detailed description read in conjunction with the drawings wherein :

Fig.1 is an exploded view of an embodiment;

Fig 2 is a block diagram demonstrating charging and discharging functions in accordance with the embodiment;

25 Fig.3 is a perspective view of the embodiment when used as a flashlight;

Fig.4 is a perspective view of the embodiment when used as a warning sign with a tripod;

Fig.5 is an exploded view showing the rechargeable device used directly with the illuminating device;

5 Fig.6 is a perspective view showing the illuminating device with a pivotally connected lamp;

Fig.7 is an exploded view of the embodiment showing the three bars engagable with the three legs to enhance the strength of the three legs;

Fig.8 is a perspective view of another embodiment showing a manual power generator  
10 is used in the embodiment;

Fig.9 is a perspective view of the embodiment showing a manual power generator is used alone with the illuminating device;

Fig.10 is a perspective view demonstrating the movements of the driving set of the manual power generator when the handle is pressed; and

15 Fig.11 is a perspective view demonstrating the movements of the driving set of the manual power generator when the handle is released.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

20 [0010] With reference to Fig.1, a first embodiment of the present invention mainly contains a base 20, three legs 21, and a rechargeable device 2. The base 20 has a top portion 20a and a bottom portion 20b having a first electric socket 201 therein. Each of the three legs 21 is pivotally secured to the base 20. Each of the three legs 21 has plural illuminating elements 211 thereon. The plural illuminating elements 211 are  
25 electrically connected to the first electric socket 201. The illuminating elements 211

are LEDs. The rechargeable device 2 contains a shell 3, plural rechargeable batteries 31, a charging circuit 32, and a discharging circuit 33. The shell 3 has a charging connector 30 detachably plugged into a power socket, which is an automobile charging socket 1 or the first electric socket 201. The charging connector 30 has a first electric contact 300, a second electric contact 301 and a third electric contact 302. The plural rechargeable batteries 31 are installed within the shell 3. The charging circuit 32 is installed within the shell 3. The charging circuit 32 is electrically connected to the plural rechargeable batteries 31 and a first electrical point between the first electric contact 300 and the second electric contact 301 for recharging the plural rechargeable batteries 31 through the first electric contact 300 and the second electric contact 301 when the charging connector 30 is plugged into the automobile charging socket 1. The discharging circuit 33 is installed within the shell 3, the discharging circuit 33 is electrically connected to the plural rechargeable batteries 31 and a second electrical point between the first electric contact 300 and the third electric contact 302 for providing electric power from the plural rechargeable batteries 31 to the plural illuminating elements 211 through the first electric contact 300, the third electric contact 302 and the first electric socket 201 when the charging connector 30 is plugged into the first electric socket 201. The three legs 21 are stretchable to be a support and retractable to be assembled as a baton.

[0011] With reference to Fig.3 and Fig.4 and Fig.6, an illuminating device 10 is coupled with the embodiment. The illuminating device 10 contains a body 101 pivotally connected to the top portion 20a of the base 20 and a lamp 102 mounted at the body 101. The lamp 102 is electrically connected to the rechargeable device 2. The body 101 is detachably mounted to the top portion 20a of the base 20. The body 101 has a second electric socket 12 pluggable by the charging connector 30, whereby

the rechargeable device 2 can provide electric power directly to the lamp 102 of the illuminating device 10. Therefore, the illuminating device 10 together with the rechargeable device 2 is used as a flashlight.

[0012] With reference to Fig.2, the automobile charging socket 1 (or a household power source) provides electric power through the first electric contact 300 and the second electric contact 301 to charge the rechargeable batteries 31. The rechargeable batteries 31 provides electric power through the first electric contact 300 and the third electric contact 302 to the first electric socket 201 or the second electric socket 12.

[0013] With reference to Fig.1, the base 20 has a first switch 103 thereon for deciding whether the rechargeable device 2 is electrically connected to the plural illuminating elements 211. Referring to Fig. 3 and Fig.4, the body 101 of the illuminating device 10 has a second switch 104 and a third switch 105 thereon. The second switch 104 is for deciding whether the rechargeable device 2 is electrically connected to the lamp 102 of the illuminating device 10 and the third switch 105 is for deciding whether the rechargeable device 2 is electrically connected to the plural illuminating elements 211.

With reference to Fig.1 and Fig.5, the top portion 20a of the base 20 forms an outer threaded periphery 202 engagable with an inner threaded periphery 11 in the body 101 of the illuminating device 10. The top portion 20a of the base 20 also has plural outer elastic electric contacts 26 thereon and the body 101 of the illuminating device 10 further contains plural inner ring electric contacts 13 therein. The plural outer elastic electric contacts 26 are electrically connected to the plural inner ring electric contacts 13 when the body 101 is threadly mounted at the top portion 20a of the base 20.

[0014] The first embodiment has three first rods 22 and a first ring 23 for restrain the movements of the three legs 21 when the three legs 21 are stretched to be used as a tripod. Each of the three first rods 22 is pivotally connected to a middle portion of

each of the three legs 21 with one end and pivotally connected to the first ring 23 with the other end. Each of the three legs 21 contains a longitude frame 210 and a light pervious shell 212. The longitude frame 210 has the plural LEDs 211 thereon. The longitude frame 210 is pivotally secured to the base 20. The light pervious shell 212 is fastened to the longitude frame 210. The light pervious shell 212 covers the plural LEDs 211. With reference to Fig.7, the first embodiment has three bars 25. Each of the three bars 25 is engaged with two adjacent legs for enhancing strength of the three legs 21. Each of the three bars 25 has two protrusions 250 on its two ends respectively. Each of the three legs 21 contains two holes 213 therein; wherein one of the two protrusions 250 is engaged with a hole of a leg and the other protrusion is engaged with a hole of an adjacent leg. Referring to Fig. 1, the first embodiment has three second rods 400 and a second ring 401. Each of the three second rods 400 is pivotally connected to a front portion of each of the three legs 21 with one end and pivotally connected to the second ring 401 with the other end.

[0015] With reference to Fig. 1, the first embodiment has a bottom cover 24 having three engaging hooks 240 thereon. Each of the plural legs 21 has a positioning hook 214 at its end, wherein each of the three engaging hooks 240 is engaged with each of the positioning hook 214 when the bottom cover 24 is tightened to assemble the plural legs as a baton (Fig. 3). With reference to Fig.4 and Fig.7, a rope 29 connects the first ring 23 to the bottom cover 24 to avoid missing of the bottom cover 24.

[0016] With reference to Fig. 8, the second embodiment has the same elements and structures of the first embodiment besides that the second embodiment further contains a manual power generator 5 installed in the body 101 of the illuminating device 10 for manually providing electric power to the lamp 102. Referring to Fig.9,

the manual power generator 5 together with the illuminating device 10 alone is used as a flashlight.

[0017] With reference to Fig. 10 and Fig. 11, the manual power generator 5 mainly contains: a housing 4, a power generating unit (not shown), a driving set 55, a handle 50 and a spring 500. The power generating unit is installed interior of the housing 4 for generating electric power. The driving set 55 is installed interior of the housing 4 and formed by a plurality of speed changing gears for driving the power generating unit. The power generating unit transfers mechanic power to electric power. The handle 50 has an end pivotally installed in front of the housing 4 for driving the driving set 55. The spring 500 is installed within the housing 4 for resisting against the handle 50, thereby the handle 50 can be restore automatically. The handle 50 has a cambered rack 501 at the end thereof. A fastener 56 is installed on the inner surface of the housing for being engaged with a slot 502 of the handle 50 in order the handle 50 to be in alignment with the surface of the housing 4 when the manual power generator 5 is not used. The driving set 55 contains a first speed changing gear 551, a second speed changing gear 552. The first speed changing gear 551 contains a first gear 553 and a first pinion 554 engaged with the cambered rack 501. The first gear 553 and the first pinion 554 are coaxially mounted. The second speed changing gear 552 contains a second gear 558, a second pinion 559 engaged with the first gear 553, a prism plate 555 having two blocks 556 pivotally connected thereto, and a rotary wheel 557 coaxially secured to the second gear 558. The prism plate 555 is mounted integrally with the second pinion 559. The inner wall of the second gear 558 has several teeth grooves 558a. Each of said several teeth groove 558a has a vertical stopping wall (not shown). The rotary wheel 557 is coaxially secured to an input axis of the power generating unit.



[0018] With reference to Fig.10, the transmission process is described as follows:

when the handle 50 is pressed, the cambered rack 501 drives the first pinion 554 to rotate counterclockwise. Since the first pinion 554 and the first gear 553 are mounted integrally, they rotate synchronously. The first gear 553 drives the second pinion 559 to rotate clockwise. Since the second pinion 559 and the prism plate 555 are mounted integrally, they rotate synchronously. Because of the centrifugal force effect caused by the rotation of the prism plate 555, the two blocks 556 engage with the teeth grooves 558a against the vertical stopping wall. The two blocks 556 then drives the second gear 558 and the rotary wheel 557 rotate. Then, the rotary wheel 557 drives an input axis (not shown) of the power generating unit. Accordingly the power generating unit is driven.

[0019] With reference to Fig.11, when the handle 50 is released, the spring 500 rejects the handle 50 to move clockwise. The first pinion 554 and the first gear 553 rotate clockwise and the second pinion 559 and the prism plate 555 rotate counterclockwise.

The two blocks 556 are stretched because of the centrifugal force effect and the two blocks 556 slides off the teeth grooves 558a. Accordingly, the second gear 558 and the rotary wheel 557 cannot be driven when the handle 50 is released. Therefore the second gear 558, the rotary wheel 557 and the input axis of the power generating unit can only rotate in the same direction. When the handle 50 is held and pressed

continuously, the cambered rack 501 drives the driving set 55. Because of the gear ratio effect, the rotary speed of the input axis of the power generating unit is increased through the driving set 55, so as to generate electric power.

[0020] There are several ways to practice the embodiments of the present invention.

Referring to Fig.5, the rechargeable device 2 engaged with the illuminating device 10

is used as flashlight, wherein the rechargeable device 2 provides electric power to the

lamp 102 of the illuminating device 10. Referring to Fig.4, the multifunction warning device is used as a warning sign with a tripod when the legs 21 are expended outwardly to be placed on the ground. In this practice, when the LEDs 211 are on, they can warn drivers of possible dangers. Even when the LEDs 211 are off, the light pervious shell 212 can reflect the lights from other automobiles to warn the drivers thereof of potential dangers. Referring to Fig.3, the multifunction warning device is used as an illuminating traffic baton to direct automobiles at night, when the legs 21 are retracted and assembled to a baton body and the LEDs 211 are on. In this practice, the body 101 of the illuminating device 10 is used as a handle of the traffic baton.

10 [0021] Numerous characteristics and advantages of the invention have been set forth in the foregoing description, together with details of the structure and function of the invention, and the novel features thereof are pointed out in appended claims. The disclosure, however, is illustrated only, and changes may be made in detail, especially, in matters of shape, size and arrangement of parts, materials and the combination thereof within the principle of the invention, to the full extent indicated by the broad  
15 general meaning of the terms in which the appended claims are expressed.